

Arizona State Retirement System

Global Tactical Asset Allocation (GTAA) Asset Class Review

September 21, 2012

Gary R. Dokes, Chief Investment Officer, ASRS
Dave Underwood, Equity Portfolio Manager, ASRS
Allan Martin, Partner, NEPC



Contents

- **Evolution of ASRS Tactical Asset Allocation Program**
- **ASRS Perspectives of GTAA**
- **ASRS GTAA Program Review**
 - Windham Capital Management
 - Bridgewater Associates, LP

Evolution of ASRS Tactical Asset Allocation Program

- **The ASRS Tactical Asset Allocation (TAA) program was initiated in 1984, migrating to a Global TAA strategy in 2003 with the hiring of Goldman Sachs and Bridgewater Associates.**
- **In 2007, Goldman Sachs' \$1.4 billion mandate was terminated due to organizational, investment process and volatility of return concerns. Deutsche Bank Advisors (DB) was subsequently hired as a replacement manager.**
- **In 2010, the DB GTAA team left to start an independent investment management boutique, QS Investors (QSI), and the mandate migrated to QSI. The ASRS subsequently terminated QSI in 2011 as a result of the following concerns:**
 - QSI's separation from Deutsche Bank breaks an implicit commitment with analyst teams used as resources for qualitative inputs.
 - QSI's strategy appeared to be delivering a higher component of equity beta compared to other GTAA manager alpha strategies.
 - QSI's performance lead to concerns of increased business risk in the future.

Evolution of ASRS Tactical Asset Allocation Program

- **Windham Capital Management was hired in 2011 to replace QSI, with a mandate size of up to \$500 million.**
- **The ASRS also modified the existing Bridgewater GTAA mandate in 2011.**
 - The account structure migrated from a separately managed portfolio to Bridgewater's Pure Alpha Strategy commingled investment vehicle.
 - Bridgewater's Pure Alpha Strategy provides ASRS with greater diversification benefits than the existing ASRS mandate, i.e., an increased opportunity set to include trading in emerging market debt and emerging market FX, and a smaller risk allocation for each trade is made within the fund.

ASRS Perspectives of GTAA

- **ASRS favors a more traditional GTAA approach based on the following beliefs and expectations:**
 - GTAA should provide the ASRS with a systematic framework for making macro-level tactical asset class investment decisions.
 - GTAA is viewed as an “alpha-generator” whose returns should primarily result from portfolio positioning in the economic beta asset classes in which the ASRS invests.
 - GTAA should require a demonstrated skill set in predicting the dispersion of longer-term asset class returns.
- **ASRS disfavors GTAA products in hedge fund structures due in part to high fee structure and portfolio transparency issues.**
- **The purpose of the ASRS GTAA program is:**
 - To allocate 10% +/- 5% of ASRS assets to alpha-generating strategies that provide diversification benefits relative to the ASRS SAA Policy by making global tactical asset class investments.
 - The GTAA mandate has a passively managed Custom Benchmark, or “beta” portion, which is made up of asset classes that are primarily part of the ASRS SAA Policy, and an alpha portion, which is expected to add value in both rising and falling markets through portfolio positioning relative to the beta portion.

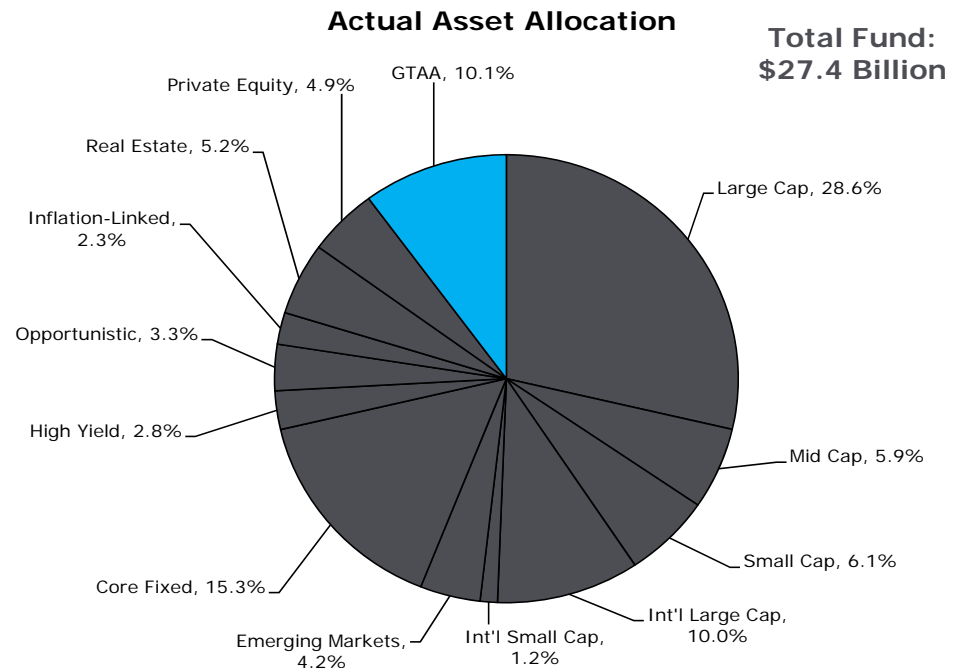
ASRS GTAA Asset Class Overview

- **Market Value: \$2.8 B**

- Policy Target: 10% +/- 5%

- **Investment Managers**

- Bridgewater Associates
 - Inception: 12/31/2003
 - Portfolio: \$2.3 B
- Windham Capital
 - Inception: 9/30/2011
 - Portfolio: \$0.5 B



- **ASRS Custom GTAA Benchmark:**

- 43% S&P 500; 25% MSCI EAFE; 28% Barclays Capital U.S. Aggregate; 4% Dow Jones/UBS Commodities Index

Note: Domestic Equity, International Equity, Fixed Income, Real Estate and Commodities allocations exclude GTAA portfolios.

ASRS GTAA Rolling Excess Returns

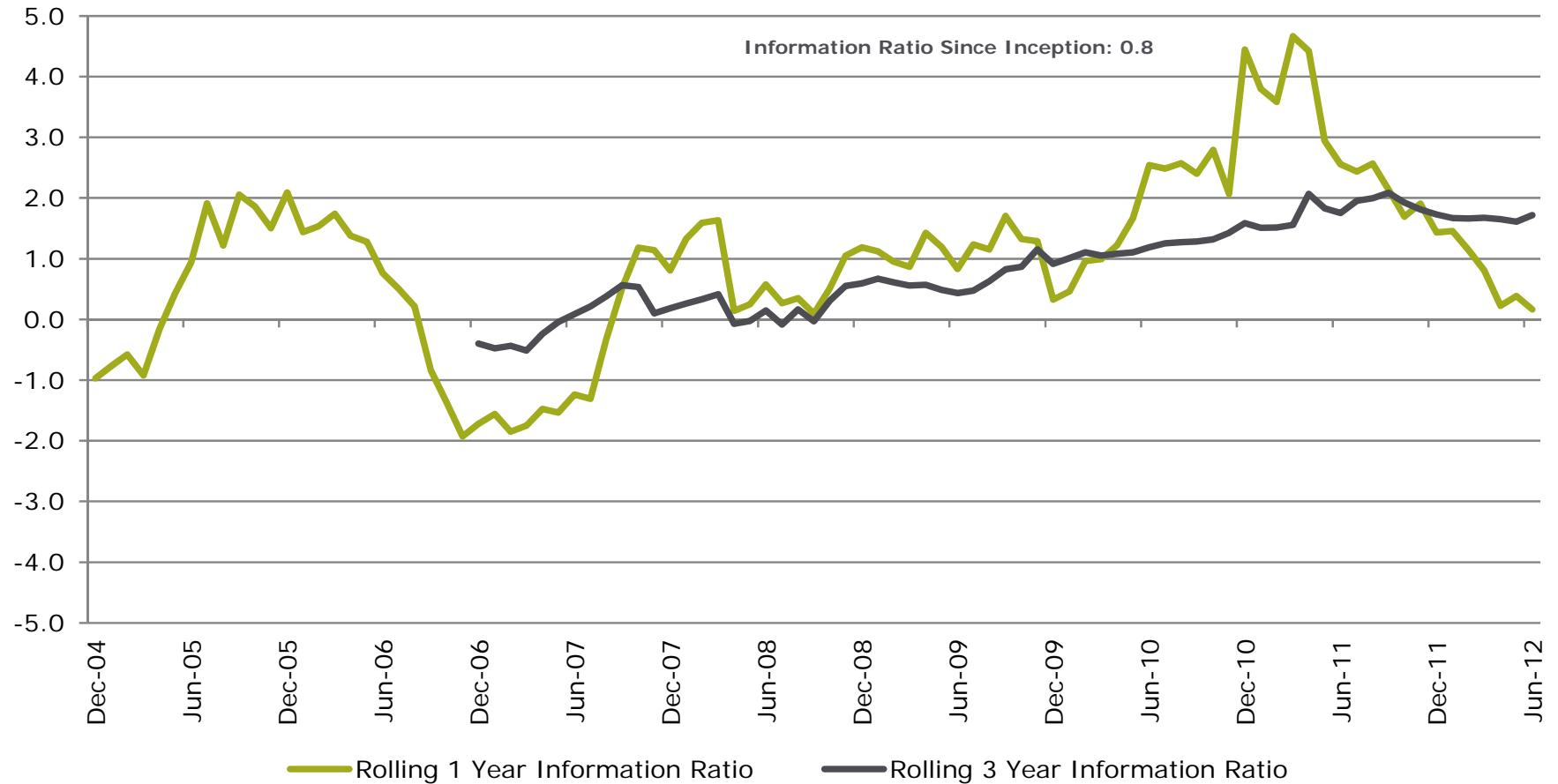
ASRS GTAA vs. ASRS Custom GTAA Benchmark¹
Excess Returns Since Inception (December 2003) – June 30, 2012



¹ASRS Custom GTAA Benchmark comprised of 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital U.S. Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital U.S. Aggregate, 3% Dow Jones/UBS Commodities Index thereafter.
Note: Based on monthly, net of fee performance data, since inception.

ASRS GTAA Rolling Information Ratios

ASRS GTAA vs. ASRS Custom GTAA Benchmark¹
Information Ratios Since Inception (December 2003) – June 30, 2012



¹ASRS Custom GTAA Benchmark comprised of 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital U.S. Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital U.S. Aggregate, 3% Dow Jones/UBS Commodities Index thereafter.
Note: Based on monthly, net of fee performance data, since inception.

ASRS GTAA Performance as of June 30, 2012

	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	YTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Return (%)	Since
Total GTAA	2,771,350,632	10.1	-2.9	70	4.6	43	2.4	33	15.8	3	4.3	20	--	--	6.7	Jan-04
ASRS Custom GTAA Benchmark ¹			<u>-2.2</u>	59	<u>6.1</u>	13	<u>2.1</u>	35	<u>12.0</u>	19	<u>1.3</u>	60	<u>5.7</u>	99	<u>5.0</u>	Jan-04
Over/Under			-0.7		-1.5		0.3		3.8		3.0				1.7	
eA Global TAA Net Median			-1.6		4.4		0.4		9.0		2.1		8.4		4.8	Jan-04
Bridgewater	2,300,497,672	8.4	-2.8	68	4.9	33	4.6	19	17.6	1	5.7	11	--	--	7.8	Jan-04
ASRS Custom GTAA Benchmark ¹			<u>-2.2</u>	59	<u>6.1</u>	13	<u>2.1</u>	35	<u>12.0</u>	19	<u>1.3</u>	60	<u>5.7</u>	99	<u>5.0</u>	Jan-04
Over/Under			-0.6		-1.2		2.5		5.6		4.4				2.8	
eA Global TAA Net Median			-1.6		4.4		0.4		9.0		2.1		8.4		4.8	Jan-04
Windham	470,852,960	1.7	-3.7	87	3.0	72	--	--	--	--	--	--	--	--	8.8	Oct-11
Windham Custom GTAA Benchmark ²			<u>-1.8</u>	55	<u>6.6</u>	11	<u>2.6</u>	32	<u>13.0</u>	10	<u>1.4</u>	57	<u>6.0</u>	99	<u>14.5</u>	Oct-11
Over/Under			-1.9		-3.6										-5.7	
eA Global TAA Net Median			-1.6		4.4		0.4		9.0		2.1		8.4		8.9	Oct-11

¹ASRS Custom GTAA Benchmark comprised of 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital U.S. Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital U.S. Aggregate, 3% Dow Jones/UBS Commodities Index thereafter.

²Windham Custom GTAA Benchmark comprised of 47% S&P 500, 18% MSCI EAFE, 26% Barclays Capital U.S. Aggregate, 6% Dow Jones REIT Index, 3% Dow Jones/UBS Commodities Index. Effective date is 10/1/2011.

Note: Performance, ranks and medians are reported net of fees.

Windham Capital Management

Firm and Strategy Profile

- **Founded by Mark Kritzman in 1988.**
- **Windham actively manages a portfolio of exchange-traded funds (ETFs) to exploit return opportunities across asset classes while seeking to protect against downside risk using proprietary (quantitative) risk indicators to detect and anticipate when markets are calm, fragile or turbulent.**
- **Primary Risk measures – financial turbulence and systemic risk.**
 - Financial Turbulence measures the statistical unusualness of a set of returns given their historical pattern behavior.
 - Systemic Risk is measured through a statistic called the absorption ratio, which equals the fraction of market variability that is explained by a subset of the most important factors.

Windham Capital Management

Firm and Strategy Profile (continued)

- **Investment merits and other rationale for selecting Windham Capital Management include:**
 - Strategy is innovative, logical and employs a scientific, unbiased approach to decision making processes.
 - Use of ETFs to access beta exposure provides greater portfolio transparency/liquidity, and is scalable.
 - The Windham investment process is consistent with ASRS Investment Beliefs.
 - Experienced management team with direct relationships with academia, Bridgewater, Cargill, NEPC, Sankaty, OPI Investors, and Blackrock.
 - Favorable management fee structure compared to other GTAA strategies.
 - Strategy and investment process differs, provides diversification and complements Bridgewater's.

Windham Capital Management

Portfolio Change – September 6, 2012

9/6/2012						
Trade #5		Domestic Equities	Foreign Equities	Real Estate	Commodities	Fixed Income
<i>Tactical Trade</i>	Portfolio	32.03%	32.53%	8.50%	6.46%	20.48%
	ASRS BM	40.00%	23.00%	8.00%	4.00%	25.00%
	Difference	-7.97%	+12.53%	+0.50%	+2.46%	-4.52%
Turbulence	High	High	Moderate	Low	Moderate	Low
Systemic Risk	High	Low	High	High	Low	Low

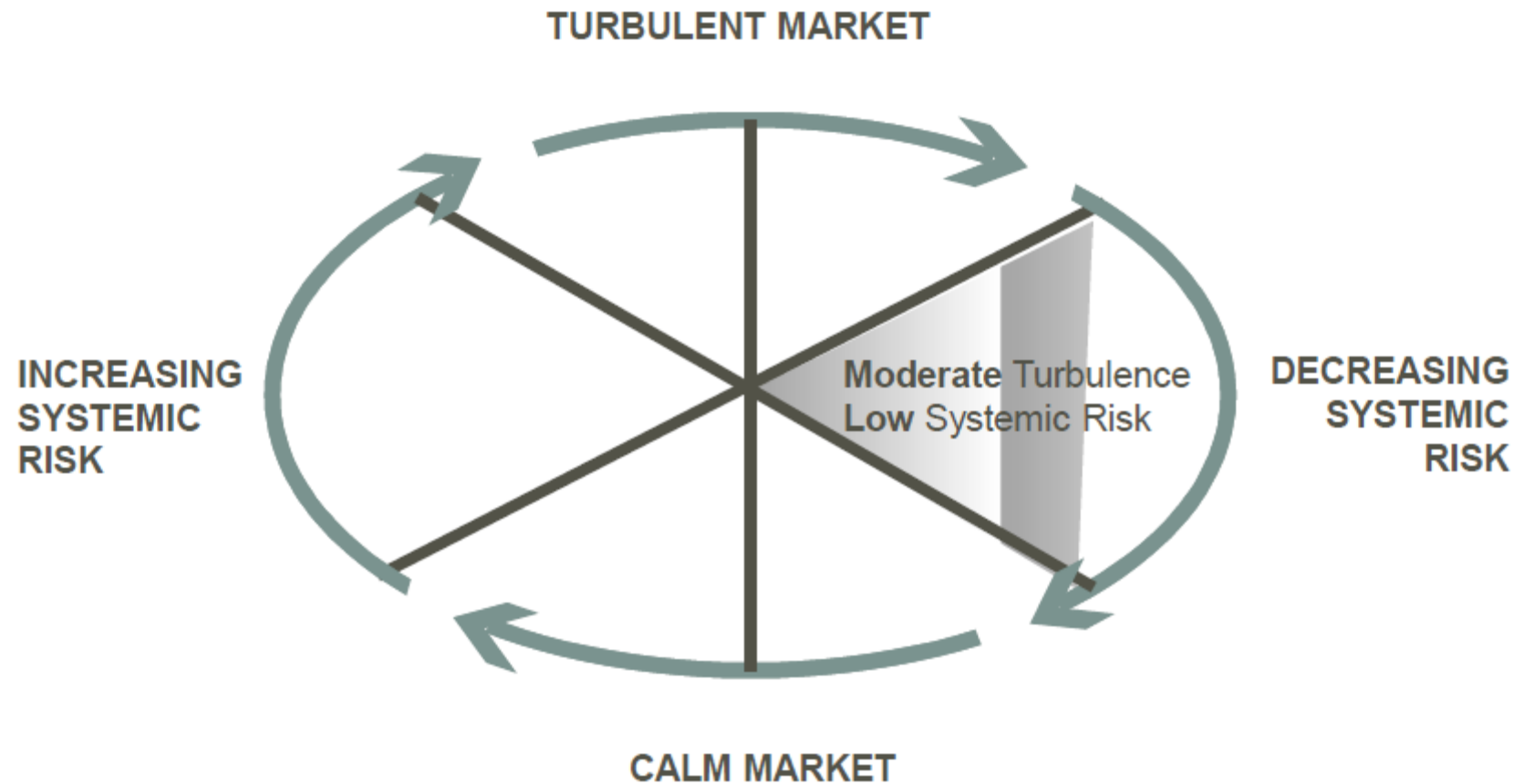
Low Portfolio Risk Profile ←————→ High Portfolio Risk Profile

- **On September 6, 2012, the Windham Portfolio increased its allocation to risky assets due to a decline in the firm's measure of Financial Turbulence.**
 - The portfolio's risk exposure is currently slightly above the benchmark.
- **Financial Turbulence captures the unusualness of asset class returns, measuring the significance of price movements and the interaction between asset classes.**
 - Current signals indicate the behavior of asset classes is "less unusual", i.e. a more favorable environment for risk taking.
 - Should the Financial Turbulence figure continue to decline, Windham will continue to increase its exposure to risky assets.
- **Systematic Risk Index, which measures the likelihood of a global sell-off due to unforeseen shocks, remains low.**
 - Should the Systematic Risk Index rise, Windham would decrease its exposure to risky assets.

Source: Windham Capital Management

Windham Capital Management

Windham Investment Risk Cycle – Current Regime



Source: Windham Capital Management

Bridgewater Associates, LP

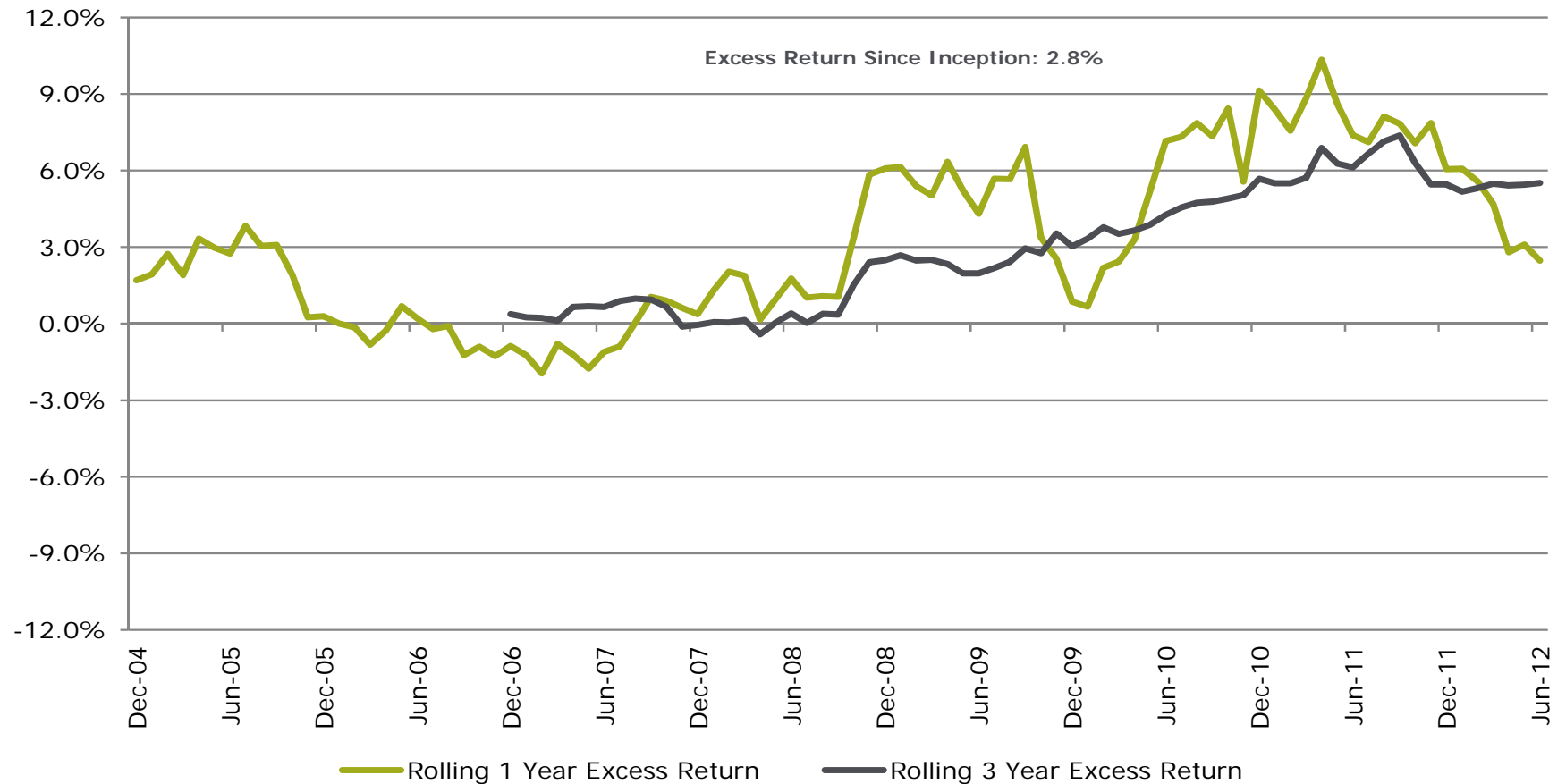
Portfolio Profile

Portfolio Size	\$2.3 Billion
Expected Excess Return	3.75%
Expected Tracking Error (Active Risk)	3.75%
Expected Information Ratio	1.00
Fees	55 bps
Portfolio Structure	3.75% Alpha Return Overlay on ASRS GTAA Custom Benchmark
Investment Process	Fundamental
<p>Bridgewater's Pure Alpha Strategy is a global active investment strategy with the goal of generating high risk-adjusted returns without any bias to the performance of markets or other active managers. The strategy is structured around Bridgewater's fixed income, equity, currency, commodity, and credit trading strategies, which are the products of over 35 years of accumulated research into the fundamental drivers of global asset returns. Bridgewater implements their understanding of these drivers of markets systematically across 100+ markets, and then builds a diversified portfolio of positions such that no source of value added will have a disproportionate impact on total portfolio's return and risk.</p>	

Note: CONFIDENTIAL and PROPRIETARY No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without prior written consent from Bridgewater Associates, LP.

Bridgewater Associates, LP

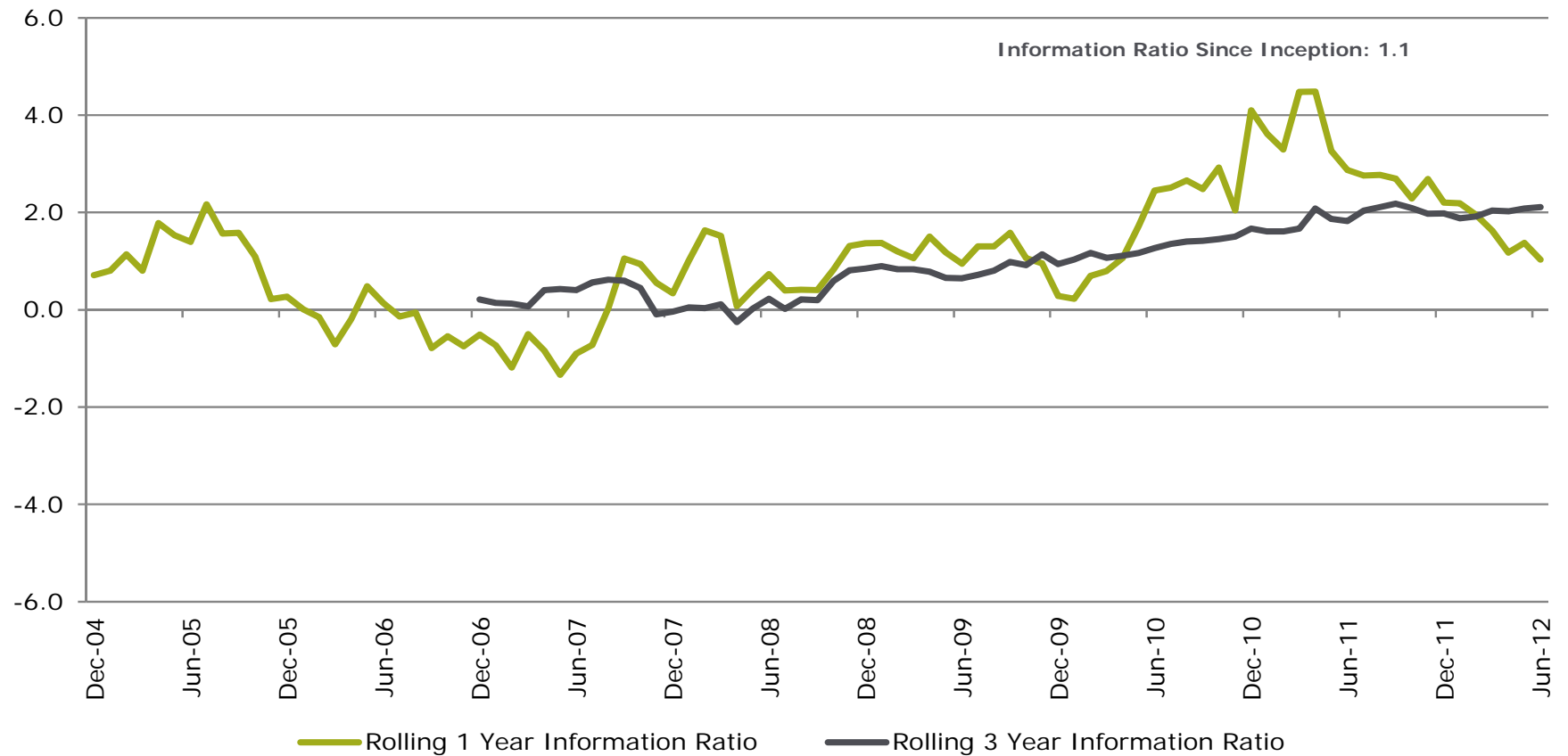
Bridgewater vs. ASRS Custom GTAA Benchmark¹
Excess Returns Since Inception (December 2003) – June 30, 2012



¹ASRS Custom GTAA Benchmark comprised of 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital U.S. Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital U.S. Aggregate, 3% Dow Jones/UBS Commodities Index thereafter.
Note: Based on monthly, net of fee performance data, since inception.

Bridgewater Associates, LP

Bridgewater vs. ASRS Custom GTAA Benchmark¹ Information Ratios Since Inception (December 2003) – June 30, 2012



¹ASRS Custom GTAA Benchmark comprised of 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital U.S. Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital U.S. Aggregate, 3% Dow Jones/UBS Commodities Index thereafter.
Note: Based on monthly, net of fee performance data, since inception.

Bridgewater Associates, LP

Portfolio Performance

Arizona State Retirement System
Gross of Fees Performance Summary Table

	Total Return	-	Official Benchmark Return	=	Alpha
2004	12.26 %		10.59 %		1.67 %
2005	6.09 %		5.73 %		0.37 %
2006	13.20 %		14.20 %	-	1.00 %
2007	7.89 %		7.00 %		0.88 %
2008	- 21.37 %	-	27.87 %		6.50 %
2009	23.07 %		21.82 %		1.24 %
2010	21.73 %		12.05 %		9.68 %
2011	7.65 %		1.06 %		6.59 %
2012 YTD	5.21 %		6.08 %	-	0.87 %
Inception	94.08 %		50.81 %		43.27 %
Annual Return	8.11 %		4.95 %		3.16 %

Arizona State Retirement System
Net of Fees Performance Summary Table

	Total Return	-	Official Benchmark Return	=	Alpha
2004	11.87 %		10.59 %		1.28 %
2005	5.73 %		5.73 %	-	0.00 %
2006	12.81 %		14.20 %	-	1.39 %
2007	7.41 %		7.00 %		0.40 %
2008	- 21.74 %	-	27.87 %		6.13 %
2009	22.59 %		21.82 %		0.77 %
2010	21.16 %		12.05 %		9.11 %
2011	7.08 %		1.06 %		6.02 %
2012 YTD	4.93 %		6.08 %	-	1.15 %
Inception	87.17 %		50.81 %		36.35 %
Annual Return	7.65 %		4.95 %		2.70 %

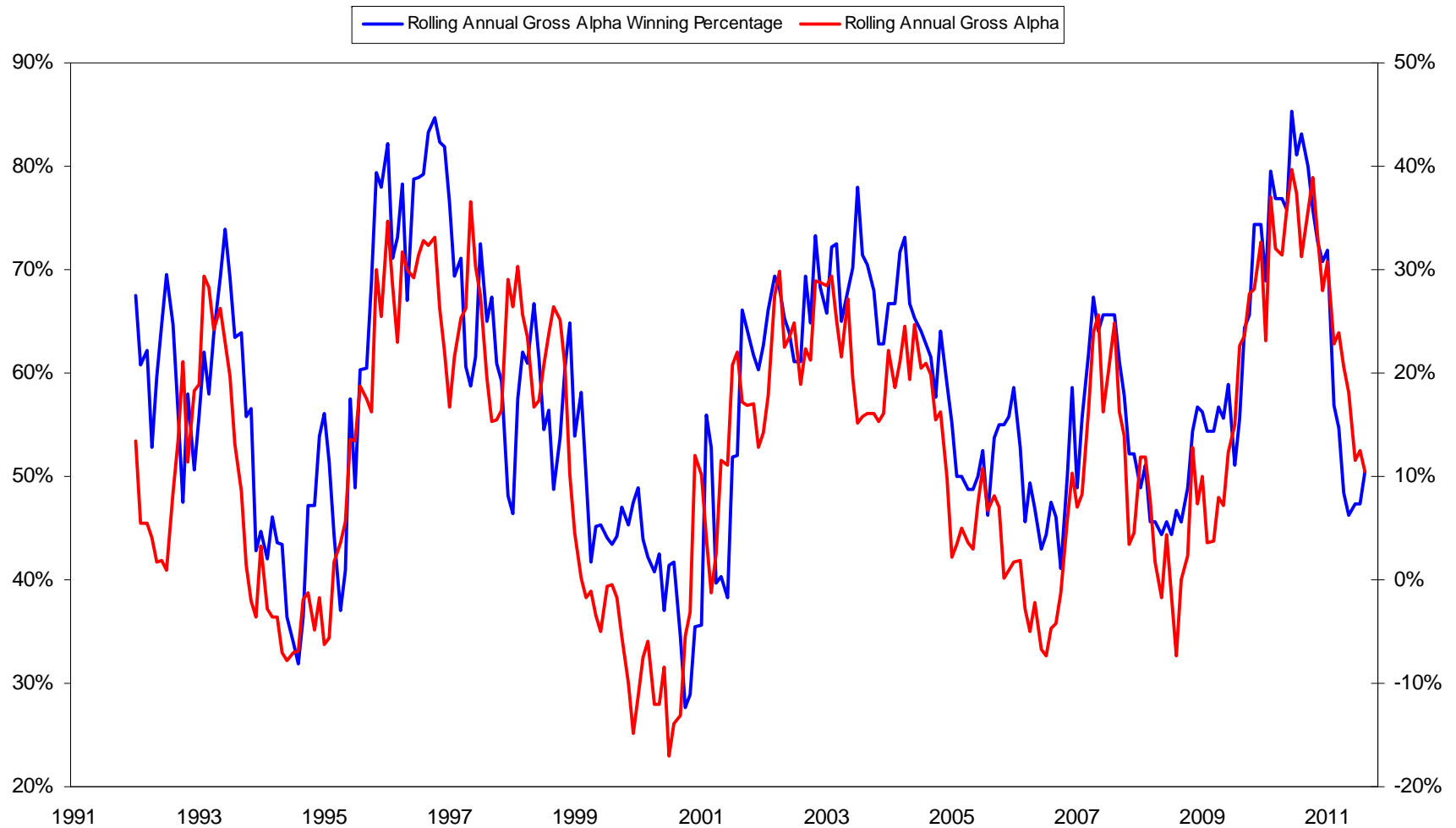
Note: Inception of the mandate was January 2004.

Effective March 2007, concurrent with the expansion of the account's leeway, the target tracking error of the mandate was decreased from 4.00% to 3.75%. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. Performance shown for Arizona's Pure Alpha mandate (4% tracking error before March 2007, 3.75% tracking error thereafter).

Source: Bridgewater Associates, LP

Bridgewater Associates, LP

Portfolio Winning Percentage



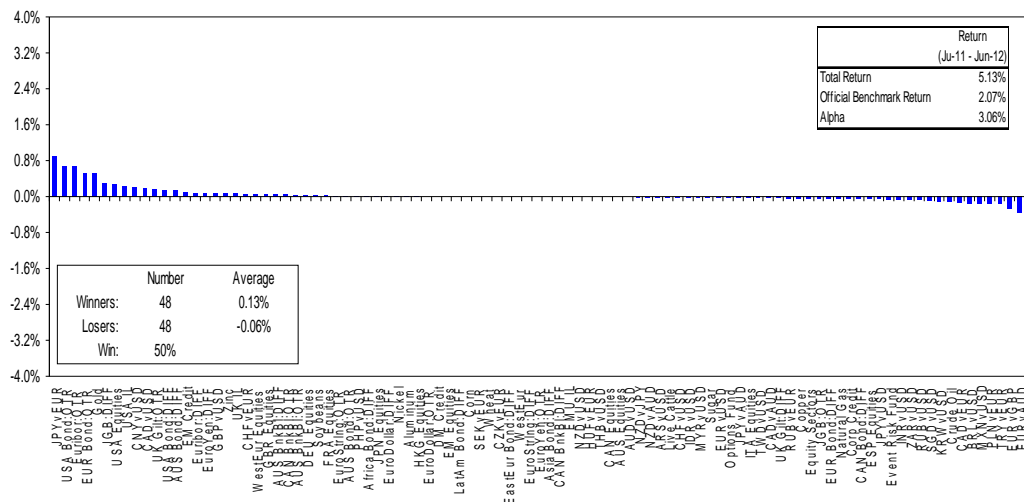
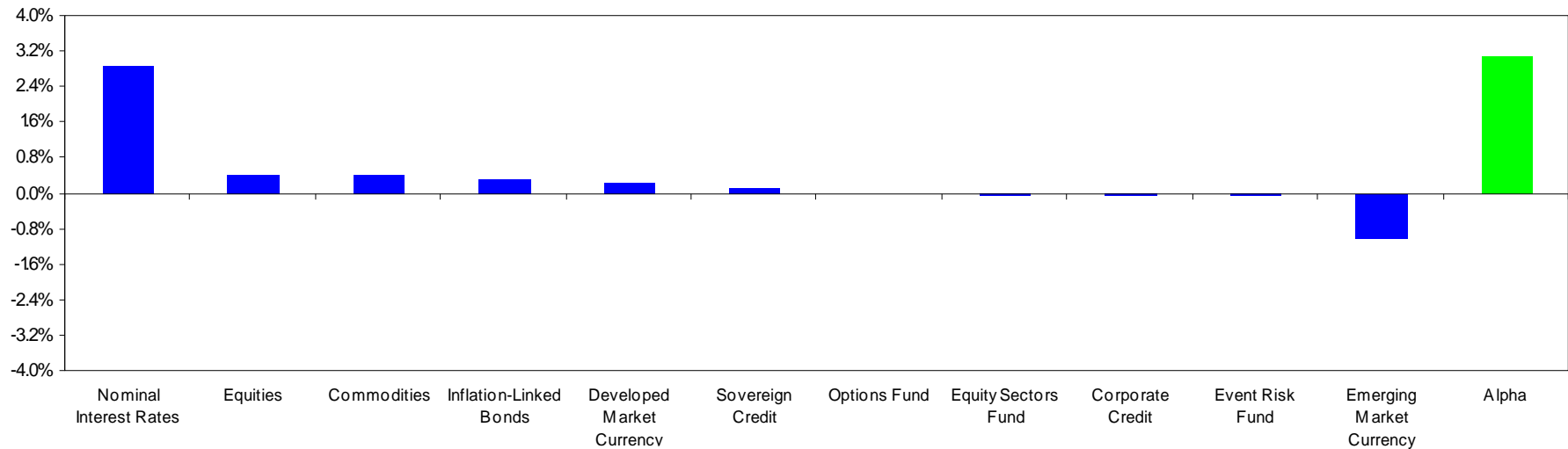
Note: Performance is shown for the Pure Alpha Strategy 12% Volatility. Attribution is based on Bridgewater analysis. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN.

Source: Bridgewater Associates, LP

Bridgewater Associates, LP

Performance Attribution/Alpha

1 Year Ending June 30, 2012



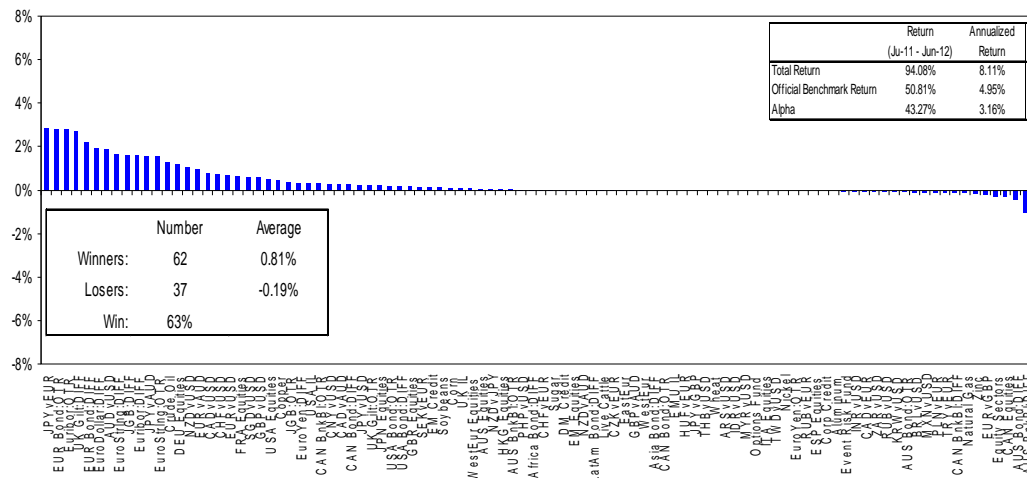
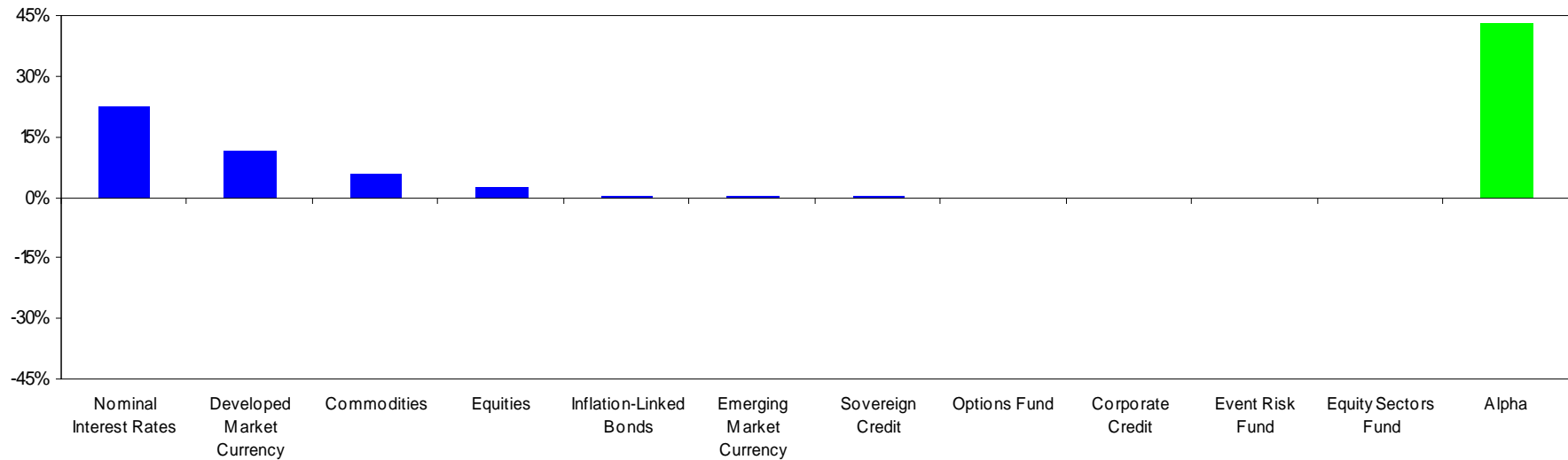
Source: Bridgewater Associates, LP

Note: The attribution charts shown are based upon the gross of fees returns of the above-referenced account, as managed by Bridgewater. Performance is estimated for the periods referenced. Where shown, gross of fees returns will be reduced by the investment advisory fees and any other expenses that may be incurred in the management of the account or investment. Attribution is based on Bridgewater analysis. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of Bridgewater Associates, LP.

Bridgewater Associates, LP

Performance Attribution/Alpha

Inception Through June 30, 2012

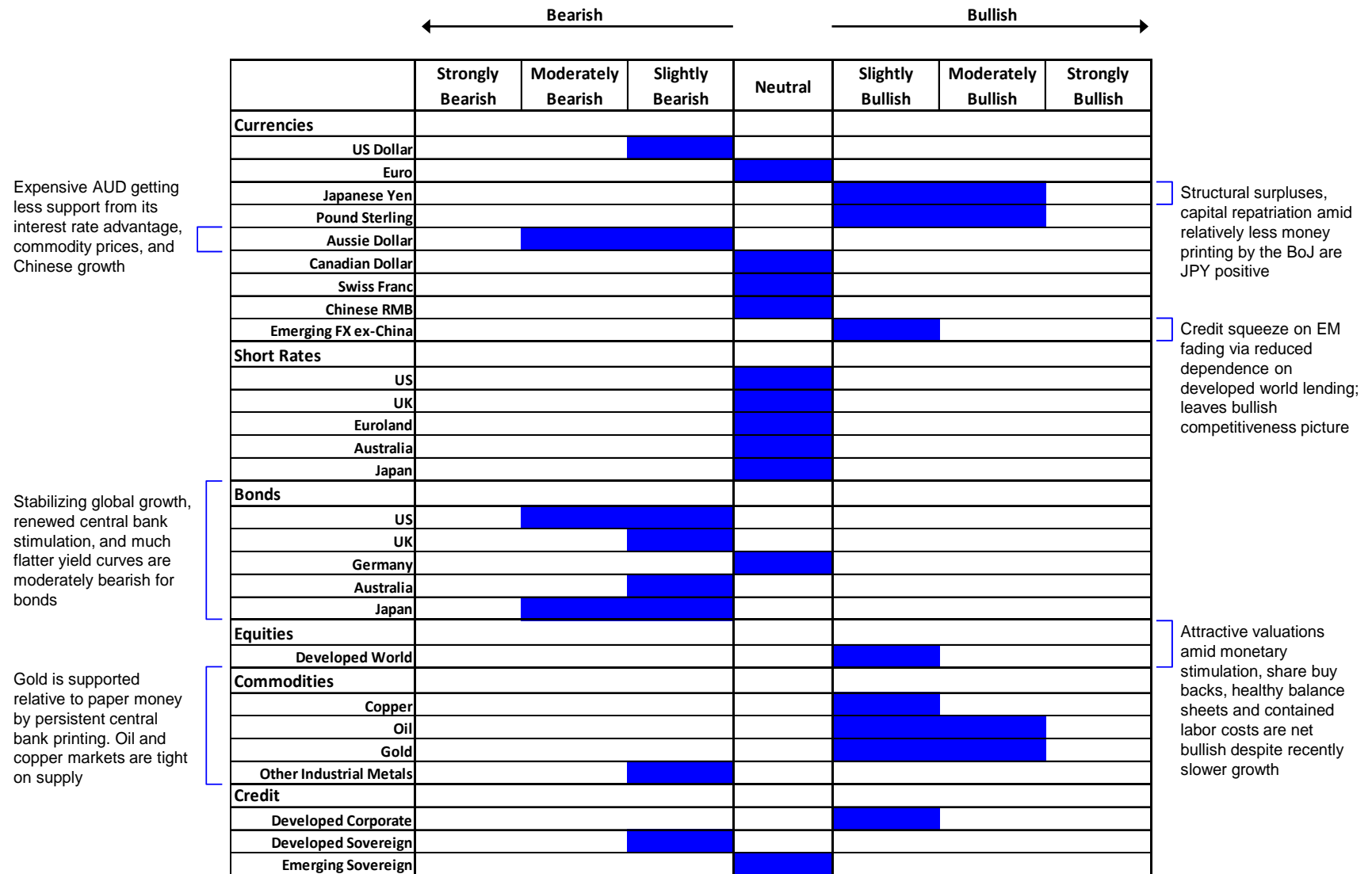


Source: Bridgewater Associates, LP

Note: The attribution charts shown are based upon the gross of fees returns of the above-referenced account, as managed by Bridgewater. Performance is estimated for the periods referenced. Where shown, gross of fees returns will be reduced by the investment advisory fees and any other expenses that may be incurred in the management of the account or investment. Attribution is based on Bridgewater analysis. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of Bridgewater Associates, LP.

Bridgewater Associates, LP

Current Portfolio Positions – As of August 31, 2012



Source: Bridgewater Associates, LP